



Technical Bulletin: Part IX Local Area Risk Level

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Ontario Ministry of the Environment
Ontario Ministry of Natural Resources

Clarification of the technical terms and alternate method for the assessment and assignment of a risk level to a local area.

The *Clean Water Act, 2006* (the Act), which came into effect in July 2007, sets the legal framework that ensures communities are able to protect their municipal drinking water supplies by developing collaborative, locally driven, science-based protection plans. Communities will identify potential risks to local water sources and take action to reduce or eliminate these risks.

In October 2006, the Ministry of the Environment (MOE) issued the document called “Assessment Report: Draft Guidance Modules” to guide the tasks being undertaken for the source protection technical studies in advance of the technical rules and regulations under the *Clean Water Act, 2006*.

The development of the assessment report is set out in the Act, regulation 287/07, and the “Technical Rules: Assessment Report” (the technical rules), dated November 2009. With the technical rules coming into effect, some of the methods set out in the Draft Guidance Modules are no longer valid. This Technical Bulletin provides updated guidance in certain areas.

The province has three (3) Tier 3 Water Quantity Risk Assessment (WQnRA) projects underway to implement the approach set out in the Technical Rules. In undertaking these first projects, the province has identified a number of situations where the methods in the technical rules are not sufficient to meet the intent of the Act.

Based on these projects, the Part IX – Local Area Risk Level of the Technical Rules has been reviewed as a result of the ongoing Tier 3 WQnRA projects. As consequence, where necessary, an alternative approach may be required to assign a local area risk level. The following approach is a **tested** and **consistent** alternative approach that can be applied by any source

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protection committee (SPC) in the province to evaluate the circumstances in which water quantity threats could be considered as significant or moderate threats in their source protection area.

The focus of this Technical Bulletin is to provide clarity on the following:

- The assessment of the circumstances in which significant and moderate local area risk levels are assigned, by providing tables that link the type of system, temporal and landscape scenarios and the circumstances for each scenario;
- The application and evaluation of “tolerance” and “other uses”, as part of the assessment of circumstances. This method would clearly align with the method used to evaluate the risk of water quality threats through an assessment of circumstances:

By undertaking the risk assessment following the tables provided in this technical bulletin, the tables would clearly guide the application of tolerance only to existing municipal systems and only when average demand can be met but peak demands cannot.

Also, the tables would clearly guide the consideration of “other uses” only for planned municipal systems or existing municipal systems with committed demand for average conditions. Other uses would not be considered for existing systems or drought scenarios.

- The introduction of thresholds when considering “other uses” for the reduction of groundwater discharge-surface water flows (because of increased groundwater pumping) for cold water fisheries in headwaters of rivers and streams;
- The introduction of professional judgement (unacceptable impacts or measurable but potentially unacceptable impacts to regulated water levels and/or flows or permits, aquatic habitat of river systems and provincially significant wetlands) to assist in assigning risk levels to local areas;
- The clarification of terms used in the evaluation of Risk Level under Part IX of the Technical Rules, such as allocated and committed demands

The result is an assigned level of risk to the local area thereby eliminating the term “*exposure*”, which becomes irrelevant following the proposed alternative approach and tables of circumstances.

Alternative Approach for Assigning a Risk Level to a Local Area

This Technical bulletin has been organised into the following Sections:

1. Alternative Approach for Part IX – Local Area Risk Level
Task 1: Evaluation of Risk
Task 2: Tolerance Level, Existing Drinking Water Systems

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Task 3: Assignment of Risk Level

2. Clarifications in Regard to Allocated Quantity of Water
3. Rule 15.1 – Alternative Approach

These sections describe the steps required to undertake Part IX – Local Area Risk Level of the Technical Rules required for water quantity risk assessment of the Assessment Report in assigning a risk level to a local area, by following an alternative approach which reflects the above clarifications.

1. Alternative Approach for Part IX – Local Area Risk Level

Task 1: Evaluation of Risk Level

(1) A risk level must be assigned to every local area required to be delineated in accordance with Part III of the Technical Rules. The risk level must be assigned by:

- evaluating the scenarios developed in the water budget models for the Tier 3 of the WQnRA, and described in Tables 4A and 4B which are provided below in this Technical Bulletin
- for each scenario, evaluating the circumstances in Tables 4C and 4D which are provided below in this Technical Bulletin.

Tables 4A and 4B describe respectively the Surface Water and the Groundwater Risk Scenarios. For each assessment Scenario, the Tables provide the time period for the assessment, as well as requirements for land cover, municipal allocated pumping rate, non-municipal pumping rates and model simulation approach.

Tables 4C and 4D provide the Circumstances to be taken into account for each Scenario to assign significant or moderate Risk, for each type of drinking water system.

(2) For the purposes of assessing the circumstances described in Tasks 2 and 3 below:

- (A) the time period to be assessed is the time period described in Column 2 of Tables 4A and 4B; and
- (B) the data used shall meet the requirements listed in Columns 3 and 4 of Tables 4A and 4B where one or more parameters in respect of the data are listed, and in all other cases the data shall be reflective of conditions that existed during the time period.

(3) For the purposes of Task 3 below, the other uses of water in the area are,

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- (A) with respect to surface water,
 - (a) waste water assimilation,
 - (b) surface water takings downstream of the intake or intakes,
 - (c) electric power generation,
 - (d) navigation,
 - (e) recreation,
 - (f) aquatic habitat, and
 - (g) provincially significant wetlands; and
- (B) with respect to groundwater,
 - (h) down gradient groundwater takings by other persons in the area,
 - (i) aquatic habitat, and
 - (j) provincially significant wetlands.

Task 2: Tolerance Level, Existing Drinking Water Systems

If the local area relates to an existing municipal drinking water system, a tolerance level must be assigned in accordance with the approach described below:

An existing type I, II or III system shall be assigned one of the following tolerance levels:

- (1) High, if the system obtains water from a surface water intake relating to a local area assessed in accordance with the circumstances described in Task 3.1 (1)(b) of this Technical Bulletin and at all times during that assessment, the system would have been capable of meeting the peak demands of users of the system.
- (2) High, if the system obtains water from a well relating to a local area assessed in accordance with the circumstances described in Task 3.1 (2)(b) of this Technical Bulletin and at all times during that assessment, the system would have been capable of meeting the peak demands of users of the system.
- (3) Low, if a tolerance level is not assigned in accordance with either of (1) or (2) above.

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Task 3: Assignment of Risk Level.

The models used in Part III of the Technical Rules to prepare the water budget for the local area shall be used to assess the scenarios described in Task 3.

Task 3.1: Assignment of Significant Risk Level

A local area has a risk level of significant if one or more of the following circumstances exist:

- (1) Scenarios A and B in Tables 4A and 4C - One or More Surface Water Intakes.
 - (a) If at any time during scenario A or B the quantity of water that could have been taken from surface water bodies in the local area would not have been sufficient to meet the allocated quantity of water taken by those municipal surface water intakes.
 - (b) If at any time during scenario A or B the quantity of water that could have been taken from surface water bodies in the local area would have been sufficient to meet the allocated quantity of water taken by those municipal surface water intakes and the tolerance is Low.
- (2) Scenarios C and D in Tables 4B and 4D - One or More Groundwater Wells
 - (a) If at any time during scenario C or D the quantity of water that could have been taken from groundwater in the local area would not have been sufficient to meet the allocated quantity of water taken by those municipal groundwater wells.
 - (b) If at any time during scenario C or D the quantity of water that could have been taken from groundwater in the local area would have been sufficient to meet the allocated quantity of water taken by those municipal groundwater wells and the tolerance is Low.
- (3) Scenarios E1, E2, E3 and F1, F2, F3 in Tables 4A and 4C - One or More Surface Water Intakes.
 - (a) If a planned system or an existing system with a committed demand greater than 0 L/s, at any time during scenarios E1,2,3 or F1,2,3 the quantity of water that can be taken from surface water bodies in the local area would not be sufficient to meet the allocated quantity of water for those municipal surface water intakes.
 - (b) If a planned system or an existing system with a committed demand greater than 0 L/s, at any time during scenario E1,2,3 the quantity of water that can be taken from surface water bodies in the local area would be sufficient to meet the allocated quantity of water for those municipal surface water intakes and one or more of the following circumstance exists:

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- (i) the reduction in existing surface water levels and/or flows results, in response to the allocated pumping rates, in unacceptable impacts to existing regulated water levels and/or flows or permits.
 - (ii) the reduction in existing surface water levels and/or flows results, in response to the allocated pumping rates, in unacceptable impacts to aquatic habitat and provincially significant wetlands.
- (4) Scenarios G1, G2, G3 and H1, H2, H3 in Tables 4B and 4D - One or More Groundwater Wells
 - (a) If a planned system or an existing system with a committed demand greater than 0 L/s, at any time during scenarios G1,2,3 or H1,2,3 the quantity of water that can be taken from groundwater in the local area would not be sufficient to meet the allocated quantity of water for those municipal groundwater wells.
 - (b) If a planned system or an existing system with a committed demand greater than 0 L/s, at any time during scenarios G1,2,3 the quantity of water that can be taken from groundwater in the local area would be sufficient to meet the allocated quantity of water for those municipal groundwater wells and one or more of the following circumstance exists:
 - (i) the reduction in existing groundwater levels and/or flows results, in response to the allocated pumping rates, in unacceptable impacts to existing regulated water levels and/or flows or permits.
 - (ii) the reduction in existing groundwater discharge, in response to the allocated pumping rates, into a coldwater watercourse by a threshold calculated as greater than 20 percent as compared to the existing estimated monthly streamflow Qp80 (the flow that is exceeded 80 percent of the time) or the average monthly baseflow of the watercourse or another threshold that has already been defined as a condition in an exiting permit.
 - (iii) the reduction in existing groundwater levels and/or flows results, in response to the allocated pumping rates, in unacceptable impacts to provincially significant wetlands.

Task 3.2: Assignment of Moderate Risk Level

A local area has a risk level of moderate if one or more of the following circumstances exist:

- (1) Scenarios E1, E2, E3 in Tables 4A and 4C - One or More Surface Water Intakes .
 - (a) If a planned system or an existing system with a committed demand greater than 0 L/s, at any time during scenarios E1,2,3 the quantity of water that can be taken from surface water bodies in the local area would be sufficient to meet the

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allocated quantity of water for those municipal surface water intakes and one or more of the following circumstance exists:

- (i) the reduction in existing surface water levels and/or flows results, in response to the allocated pumping rates, in measurable and potentially unacceptable impacts to existing regulated water levels and/or flows or permits.
- (ii) the reduction in existing surface water levels and/or flows results, in response to the allocated pumping rates, in a measurable and potentially unacceptable impact to aquatic habitat and provincially significant wetlands.

(2) Scenarios G1, G2, G3 in Tables 4B and 4D - One or More Groundwater Wells

- (a) If a planned system or an existing system with a committed demand greater than 0 L/s, at any time during scenarios G1,2,3 the quantity of water that can be taken from groundwater in the local area would be sufficient to meet the allocated quantity of water for those municipal groundwater wells and one or more of the following circumstance exists:
 - (i) the reduction in existing groundwater levels and/or flows results, in response to the allocated pumping rates, in measurable and potentially unacceptable impacts to existing regulated water levels and/or flows or permits.
 - (ii) the reduction in existing groundwater discharge, in response to the allocated pumping rates, into a coldwater watercourse by a threshold calculated between a minimum of 10 percent but not greater than 20 percent as compared to the existing estimated monthly streamflow Qp80 (the flow that is exceeded 80 percent of the time) or the average monthly baseflow of the watercourse or another threshold that has already been defined as a condition in an exiting permit.
 - (iii) the reduction in existing groundwater levels and/or flows results, in response to the allocated pumping rates, in measurable but acceptable impacts to provincially significant wetlands.

Task 3.3: Uncertainty and Sensitivity Analysis

An analysis of the uncertainty, characterized as high or low, must be made in respect of the risk level for the local area.

(1) The following factors shall be considered in an analysis of uncertainty for Task 3.2:

- (a) The distribution, variability, quality and relevance of the available input data;
- (b) The ability of the methods and models used to accurately reflect the hydrologic system;

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- (c) The quality assurance and quality control procedures applied; and
 - (d) The extent and level of calibration and validation achieved for any groundwater and surface models used or calculations and general assessments completed.
- (2) Despite Task 3.2, a local area has a risk level of significant if,
- (a) uncertainty determined in accordance with (1) is high; and
 - (b) a sensitivity analysis of the data used to prepare the water budget for the local area suggests that the risk level for the local area could be significant.

Task 3.4: Assignment of Low Risk Level

Where a local area was not assigned a risk level of significant or moderate in accordance with Tasks 3.1, 3.2 and 3.3, the local area has a risk level of low.

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Table 4A – Surface Water Risk Scenarios

Scenario	Time Period	Surface Water Model Scenarios				
		Land Cover	Allocated Pumping Rate (municipal)	Pumping Rate (non-municipal)	Model Simulation	
A	The period for which climate and stream flow data are available for the local area	Existing	Existing	Existing	Continuous (Daily); Monthly pumping	
B	2/10 year drought period	Existing	Existing	Existing	Continuous (Daily); Monthly pumping	
E(1)	The period for which climate and stream flow data are available for the local area	Land cover reflective of the planned or existing plus committed (Official Plan)	Existing plus committed plus planned	Future	New Imperviou s Areas and Increase in Total Demand	Continuous (Daily); Monthly pumping
E(2)		Existing	Existing plus committed plus planned	Existing	Increase in Municipal Demand	
E(3)		Land cover reflective of the planned or existing plus committed (Official Plan)	Existing	Future	New Imperviou s Areas and Increase in Non-Municipal Demand	
F(1)	2/10 year drought period	Land cover reflective of the planned or existing plus committed (Official Plan)	Existing plus committed plus planned	Future	New Imperviou s Areas and Increase in Total Demand	Continuous (Daily); Monthly pumping
F(2)	2/10 year drought period	Existing	Existing plus committed plus planned	Existing	Increase in Municipal Demand	
F(3)	2/10 year drought period	Land cover reflective of the planned or existing plus committed (Official Plan)	Existing	Future	New Imperviou s Areas and Increase in Non-Municipal Demand	

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Table 4B – Groundwater Risk Scenarios

Scenario	Time Period	Groundwater Model Scenarios				
		Land Cover	Allocated Pumping Rate (municipal)	Pumping Rate (non-municipal)	Model Simulation	
C	The period for which climate and stream flow data are available for the local area	Existing	Existing	Existing	Steady-state, Average Annual Recharge	
D	10 year drought period	Existing	Existing	Existing	Transient; Monthly pumping and recharge rates	
G(1)	The period for which climate and stream flow data are available for the local area	Land cover reflective of the planned or existing plus committed (Official Plan)	Existing plus committed plus planned	Future	GW Recharge Reduction and Increase in Total Demand	Steady-State; Average Annual Recharge
G(2)		Existing	Existing plus committed plus planned	Existing	Increase in Municipal Demand	
G(3)		Land cover reflective of the planned or existing plus committed (Official Plan)	Existing	Future	GW Recharge Reduction and Increase in Non-Municipal Demand	
H(1)	10 year drought period	Land cover reflective of the planned or existing plus committed (Official Plan)	Existing plus committed plus planned	Future	GW Recharge Reduction and Increase in Total Demand	Transient; Monthly pumping and recharge
H(2)	10 year drought period	Existing	Existing plus committed plus planned	Existing	Increase in Municipal Demand	
H(3)	10 year drought period	Land cover reflective of the planned or existing plus committed (Official Plan)	Existing	Future	GW Recharge Reduction and Increase in Non-Municipal Demand	

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Table 4C – Risk Scenarios and Circumstances – Surface Water

Local Area - Significant Risk		
Type of System	Scenarios	Circumstance
Surface Water One or More	A- Existing – average annual B- Existing – 2/10 year drought	a) the quantity of water that could have been taken from surface water bodies in the local area would not have been sufficient to meet the allocated quantity of water taken by those municipal surface water intakes. b) the quantity of water that could have been taken from surface water bodies in the local area would have been sufficient to meet the allocated quantity of water taken by those municipal surface water intakes and the tolerance is Low.
Surface Water One or More	E- Planned system or existing system with committed demand – average annual	a) the quantity of water that can be taken from surface water bodies in the local area would not be sufficient to meet the allocated quantity of water for those municipal surface water intakes. b) the quantity of water that can be taken from surface water bodies in the local area would be sufficient to meet the allocated quantity of water for those municipal surface water intakes and one or more of the following circumstance exists: (i) the reduction in existing surface water levels and/or flows results, in response to the allocated pumping rates, in unacceptable impacts to existing regulated water levels and/or flows or permits. (ii) the reduction in existing surface water levels and/or flows results, in response to the allocated pumping rates, in unacceptable impacts to aquatic habitat and provincially significant wetlands. (iii) the reduction in existing groundwater levels and/or flows results, in response to the allocated pumping rates, in unacceptable impacts to provincially significant wetlands.
Surface Water One or More	F- Planned system or existing system with committed demand – 2/10 year drought	a) the quantity of water that can be taken from surface water bodies in the local area would not be sufficient to meet the allocated quantity of water for those municipal surface water intakes.
Local Area – Moderate Risk		
Surface Water One or More	E - Planned system or existing system with committed demand – average annual	a) the quantity of water that can be taken from surface water bodies in the local area would be sufficient to meet the allocated quantity of water for those municipal surface water intakes and one or more of the following circumstance exists: (i) the reduction in existing surface water flows and/or levels results, in response to the allocated pumping rates, in measurable and potentially unacceptable impacts to existing regulated water levels and/or flows or permits. (ii) the reduction in existing surface water levels and/or flows results, in response to the allocated pumping rates, in measurable and potentially unacceptable impacts to aquatic habitat and provincially significant wetlands. (iii) the reduction in existing groundwater levels and/or flows results, in response to the allocated pumping rates, in unacceptable impacts to provincially significant wetlands.

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Table 4D – Risk Scenarios and Circumstances – Groundwater

Local Area - Significant Risk		
Type of System	Scenarios	Circumstance
Groundwater One or More	C - Existing – average annual D -Existing – 10 year drought	a) the quantity of water that could have been taken from groundwater in the local area would not have been sufficient to meet the allocated quantity of water taken by those municipal groundwater wells. b) the quantity of water that could have been taken from groundwater in the local area would have been sufficient to meet the allocated quantity of water taken by those municipal groundwater wells and the tolerance is Low.
Groundwater One or More	G - Planned system or existing system with committed demand – average annual	a) the quantity of water that can be taken from groundwater in the local area would not be sufficient to meet the allocated quantity of water for those municipal groundwater wells. b) the quantity of water that can be taken from groundwater in the local area would be sufficient to meet the allocated quantity of water for those municipal groundwater wells and one or more of the following circumstance exists: (i) the reduction in existing groundwater levels and/or flows results, in response to the allocated pumping rates, in unacceptable impacts to existing regulated water levels and/or flows or permits. (ii) the reduction in existing groundwater discharge, in response to the allocated pumping rates, into a coldwater watercourse by a threshold calculated as greater than 20 percent as compared to the existing estimated monthly streamflow Qp80 (the flow that is exceeded 80 percent of the time) or the average monthly baseflow of the watercourse or another threshold that has already been defined as a condition in an exiting permit. (iii) the reduction in existing groundwater levels and/or flows results, in response to the allocated pumping rates, in unacceptable impacts to provincially significant wetlands.
Groundwater One or More	H - Planned system or existing system with committed demand – 10 year drought	a) the quantity of water that can be taken from groundwater in the local area would not be sufficient to meet the allocated quantity of water for those municipal groundwater wells.
Local Area – Moderate Risk		
Groundwater One or More	G - Planned system or existing system with committed demand – average annual	a) the quantity of water that can be taken from groundwater in the local area would be sufficient to meet the allocated quantity of water for those municipal groundwater wells and one or more of the following circumstance exists: (i) the reduction in existing groundwater levels and/or flows results, in response to the allocated pumping rates, in measurable and potentially unacceptable impacts to existing regulated water levels and/or flows or permits. (ii) the reduction in existing groundwater discharge, in response to the allocated pumping rates, into a coldwater watercourse by a threshold calculated between a minimum of 10 percent but not greater than 20 percent as compared to the existing estimated monthly streamflow Qp80 (the flow that is exceeded 80 percent of the time) or the average monthly baseflow of the watercourse or another threshold that has already been defined as a condition in an exiting permit. (iii) the reduction in existing groundwater levels and/or flows results, in response to the allocated pumping rates, in measurable and potentially unacceptable impacts to provincially significant wetlands.

2. Clarifications in Regard to Allocated Quantity of Water

Column 4 of Tables 4A and 4B describes the allocated quantity of water that each of the scenarios must consider when assessing the circumstances in Tables 4C and 4D

Allocated Quantity of Water - Existing Systems

The allocated quantity of water for Scenarios that require an existing pumping rate is the lesser of:

- the maximum annual quantity of water that can lawfully be taken by the intake or well (i.e. the maximum annual permitted rate); and
- the sum of the mean annual quantity of water taken by the intake or well (i.e. the existing mean annual pumping rate during the study year) and any additional quantity of water that would have to be taken annually by the intake or well to meet the committed demand of the system (i.e. existing plus committed annual pumping rates).

Planned Drinking Water System

A Planned Drinking Water System, is a drinking water system that is to be established, or a part of a drinking water system that is to be established, if (Clean Water Act - O. Reg. 287/07 (General) - S1 (1):

- (a) approval to proceed with the establishment of the system or part has been given under Part II of the *Environmental Assessment Act*,
- (b) the establishment of the system or part has been identified as the preferred solution within a completed planning process conducted in accordance with an approved class environmental assessment under Part II.1 of the *Environmental Assessment Act* and no order has been issued under subsection 16 (1) of that Act, or
- (c) the system or part would serve a reserve as defined in the *Indian Act* (Canada); (“envisagé”)

The appropriate tools for planning future water supplies are the Planning Act, the Provincial Policy Statement (PPS) and the Class Environmental Assessment (EA) process. There is no legal authority in the Clean Water Act (CWA) to force municipalities to plan for their future water supply needs - municipalities already have the power to do this under the Planning Act and through the PPS. The Class EA process is used to identify and locate future water supply and servicing needs. What the CWA does provide are the tools to look at existing systems and systems that have been identified through this existing planning process (planned systems).

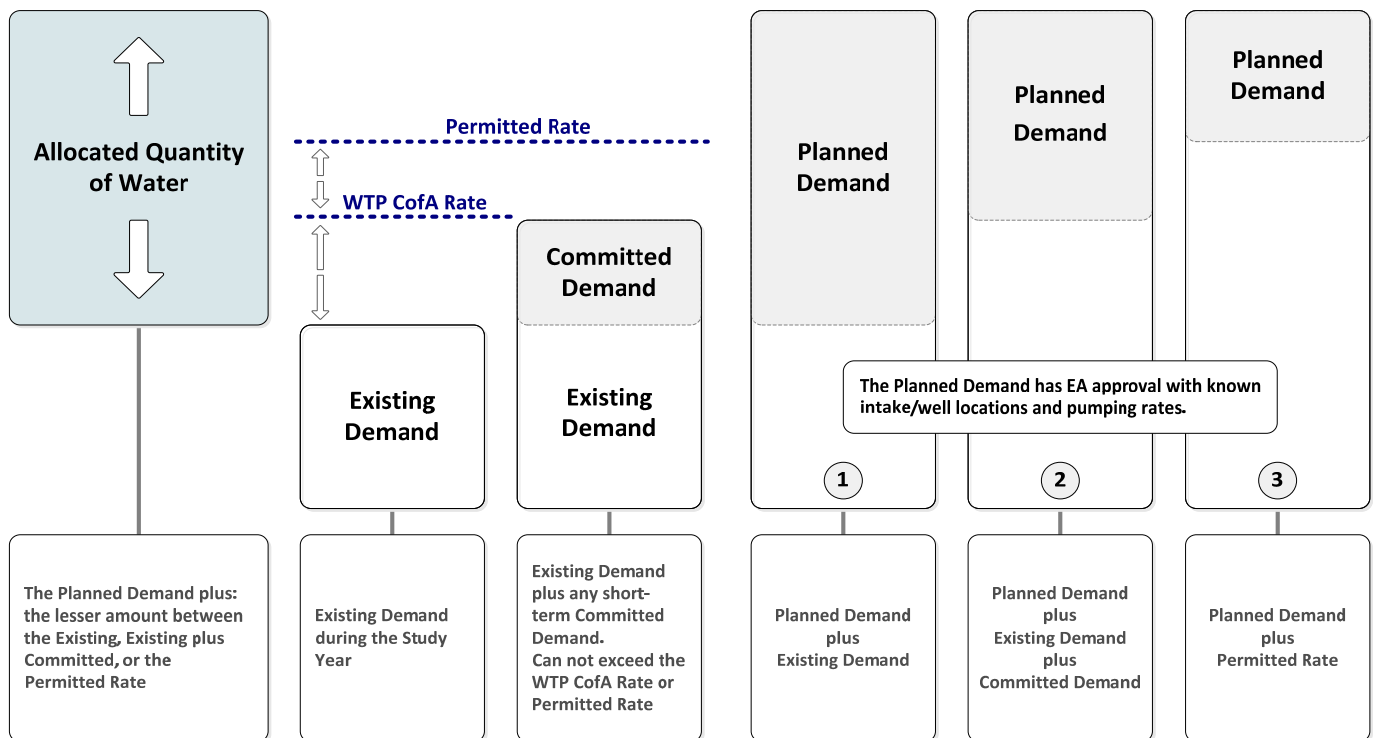
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Allocated Pumping Rate - Planned Systems

The allocated quantity of water for scenarios that require a planned pumping rate is the planned amount per the O. Reg. 287/07 (General) - S1 (1) and the lesser of:

- (a) the maximum annual quantity of water that can lawfully be taken by the intake or well (i.e. the maximum annual permitted rate); and
- (b) the sum of the mean annual quantity of water taken by the intake or well (i.e. the existing mean annual pumping rate during the study year) and any additional quantity of water that would have to be taken annually by the intake or well to meet the committed demand of the system (i.e. existing plus committed annual pumping rates).

The following diagram provides a visual interpretation of the allocated quantity of water.



3. Rule 15.1 - Alternative Approach

If an SPC uses the above Part IX recommended approach to assign risk to a local area, the SPC should use Rule 15.1 to request Director approval. This would need to include an explanation of how the method or approach used to assign the risk level is “equivalent to or better than the approach or method prescribed in the rules”. The requirements under Rule 15.1 are provided below.

Technical Rule 15.1

The Rule specifies that, despite any provision stated on any other rule, in preparing an assessment report a source protection committee may use an alternate method or approach for gathering information or for performing a task that departs from the method or approach prescribed in these rules if the following conditions are met:

- (1) The assessment report includes,
 - (a) a rationale for the departure; and
 - (b) an explanation of how the method or approach used by the source protection committee to gather information or perform the task is equivalent to or better than the approach or method prescribed in these rules
- (2) The Director has provided the source protection committee with written confirmation that he or she agrees to the departure and a copy of the confirmation is included in the assessment report.